

CLAIMS

1. In a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, a method comprising:
 - providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state; and
 - updating said entry following a change in state of at least one of said constituent data storage elements.
2. The method of claim 1, wherein updating said entry comprises:
 - identifying an entry in said data structure corresponding to a data storage unit that includes a constituent data storage element in said first state;
 - modifying status information in said entry to indicate that said data storage unit includes at least one constituent data storage element in said first state.
3. The method of claim 2, further comprising locking said data structure before modifying status information and unlocking said data structure after modifying status information.
4. The method of claim 2, wherein modifying status information comprises inspecting said status information to determine if said status information already indicates that at least one constituent data storage element is in said first state.
5. The method of claim 1, wherein updating said entry comprises:
 - detecting that a constituent data storage element is in said second state;
 - determining whether said data storage unit contains any constituent data

storage element in said first state;

identifying an entry in said data structure corresponding to a data storage unit that includes said constituent data storage element;

modifying status information in said entry to indicate that no constituent data storage elements of said data storage unit are in said first state.

6. The method of claim 5, further comprising locking said data structure before modifying status information and unlocking said data structure after modifying status information.
7. The method of claim 5, wherein modifying status information comprises inspecting said status information to determine if said status information already indicates that all constituent data storage elements are in said second state.
8. The method of claim 1, further comprising selecting said data storage unit to be a cylinder and selecting said constituent data storage elements to be tracks included in said cylinder.
9. The method of claim 8, further comprising selecting said first state to indicate the presence of invalid data on said track.
10. The method of claim 8, wherein providing a data structure comprises providing a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said cylinder includes invalid data and a second state indicating that no tracks in said cylinder include invalid data.
11. The method of claim 1, further comprising scanning said data structure to locate constituent data storage elements in said first state.
12. The method of claim 11, wherein scanning said data structure comprises:

detecting an entry in said data structure that indicates the presence, in said data storage unit associated with said data structure, of at least one constituent data storage element in said first state; and

scanning constituent data storage elements included in said data storage unit to identify said constituent data storage element in said first state.

13. A computer-readable medium having software for execution in a data-storage system having a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state, said software comprising instructions for:

providing a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state; and

updating said entry following a change in state of at least one of said constituent data storage elements.

14. The computer-readable medium of claim 13, wherein said instructions for updating said entry comprise instructions for:

identifying an entry in said data structure corresponding to a data storage unit that includes a constituent data storage element in said first state;

modifying status information in said entry to indicate that said data storage unit includes at least one constituent data storage element in said first state.

15. The computer-readable medium of claim 14, wherein said software further comprises instructions for locking said data structure before modifying status information and unlocking said data structure after modifying status information.

16. The computer-readable medium of claim 14, wherein said instructions for modifying status information comprise instructions for inspecting said status information to determine if said status information already indicates that at least one constituent data storage element is in said first state.

17. The computer-readable medium of claim 13, wherein said instructions for updating said entry comprise instructions for:
 - detecting that a constituent data storage element is in said second state;
 - determining whether said data storage unit contains any constituent data storage element in said first state;
 - identifying an entry in said data structure corresponding to a data storage unit that includes said constituent data storage element;
 - modifying status information in said entry to indicate that no constituent data storage elements of said data storage unit are in said first state.
18. The computer-readable medium of claim 17, wherein said software further comprises instructions for locking said data structure before modifying status information and unlocking said data structure after modifying status information.
19. The computer-readable medium of claim 17, wherein said instructions for modifying status information comprise instructions for inspecting said status information to determine if said status information already indicates that all constituent data storage elements are in said second state.
20. The computer-readable medium of claim 13, wherein said software further comprises instructions for selecting said data storage unit to be a cylinder and selecting said constituent data storage elements to be tracks included in said cylinder.
21. The computer-readable medium of claim 8, wherein said software further comprises instructions for selecting said first state to indicate the presence of invalid data on said track.
22. The computer-readable medium of claim 8, wherein said instructions for providing a data structure comprise instructions for providing a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said cylinder includes invalid data and a second state

indicating that no tracks in said cylinder include invalid data.

23. The computer-readable medium of claim 13, wherein said software further comprises instructions for scanning said data structure to locate constituent data storage elements in said first state.
24. The computer-readable medium of claim 11, wherein said instructions for scanning said data structure comprise instructions for:
 - detecting an entry in said data structure that indicates the presence, in said data storage unit associated with said data structure, of at least one constituent data storage element in said first state; and
 - scanning constituent data storage elements included in said data storage unit to identify said constituent data storage element in said first state.
25. A data-storage system comprising:
 - a data storage unit that includes at least two constituent data storage elements, each of said constituent data storage elements being in one of a first state and a second state other than said first state;
 - a memory element configured to hold a data structure having an entry corresponding to said data storage unit, said entry including status information indicating whether at least one constituent data storage element of said data storage unit is in said first state.
26. The data-storage system of claim 25, further comprising a lock for locking said data structure to prevent modification of said status information.
27. The data-storage system of claim 25, wherein said data storage unit comprises a cylinder and said constituent data storage elements comprise tracks included in said cylinder.
28. The data-storage system of claim 27, wherein said first state indicates the presence of invalid data on said track.

29. The data-storage system of claim 27, wherein said data structure comprises a bit map having a plurality of bits, each of which corresponds to a cylinder, each bit having a first state indicating that at least one track in said cylinder includes invalid data and a second state indicating that no tracks in said cylinder include invalid data.